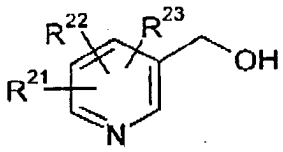
AMENDMENT TO THE CLAIMS

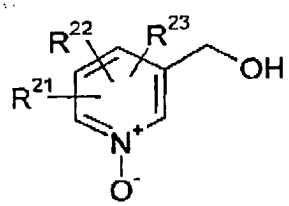
Claims 1-31 (cancelled)

32. (previously presented): A method for preventing, reducing, or eliminating side effects or neutralizing the side effects of a cancerostatic or immunosuppressive agent administered prophylactically or therapeutically to a patient, comprising administering to the patient a compound having vitamin PP activity or a prodrug thereof.

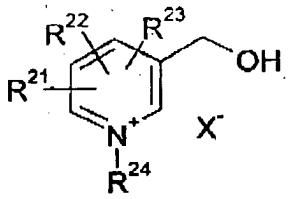
33. (Previously presented): The method of claim 32 where the compound having vitamin PP activity or a prodrug thereof is selected from the group consisting of compounds of formulae II, IIa, IIb, III, IIIa, IIIb, IIIc, IV, IVa, IVb, V, Va, and Vb:



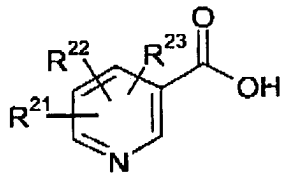
(II)



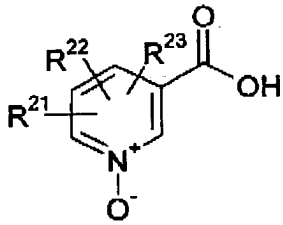
(IIa)



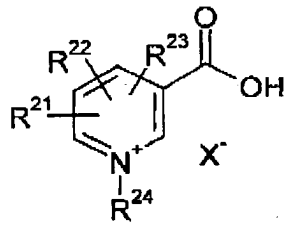
(IIb)



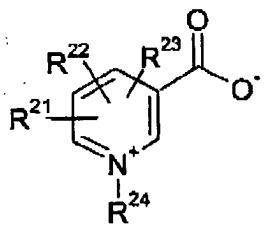
(III)



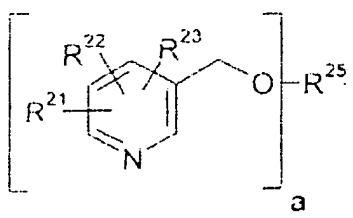
(IIIa)



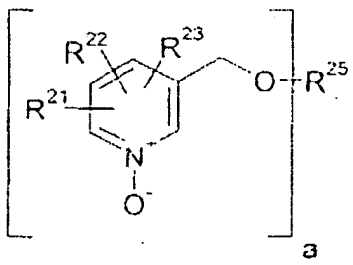
(IIIb)



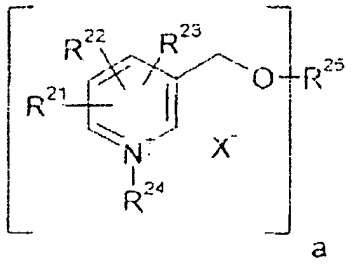
(IIIc)



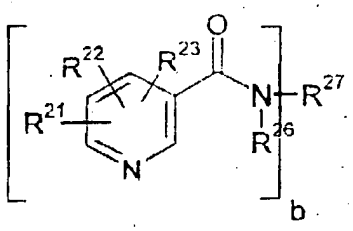
(IV)



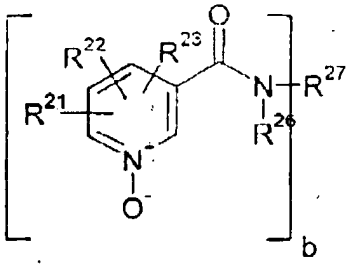
(IVa)



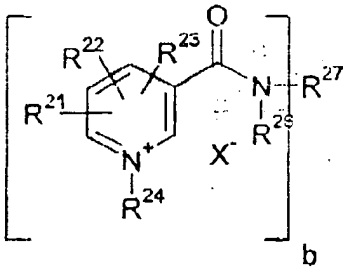
(IVb)



(V)



(Va)



(Vb)

where:

a is an integer of 1 through 6;

b is an integer of 1 through 2;

X^- is selected from the group consisting of fluoride, chloride, bromide, iodide, hydrogensulfate, mesylate, trifluoromethanesulfonate, tosylate, tetrafluoroborate, dihydrogenphosphate, and acetate;

R^{21} is selected from the group consisting of hydrogen, halogen, cyano, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, alkylthio, aminoalkyl, amino, alkylamino, dialkylamino, formyl, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, and carboxy;

R^{22} is selected from the group consisting of hydrogen, halogen, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, aminoalkyl, amino, alkoxycarbonyl, aminocarbonyl, and carboxy;

R^{23} is selected from the group consisting of hydrogen, alkyl, and hydroxyalkyl;

R^{24} is selected from the group consisting of alkyl, alkenyl, hydroxyalkyl, alkoxyalkyl, and aralkyl;

R^{25} is the residue of an alcohol $R^{25}(OH)_a$ is selected from monovalent linear and branched C_{1-10} alkanols and ω-dialkylaminoalkanols, benzyl alcohol, divalent linear and branched C_{2-10} diols, mono- or divalent C_{5-7} cycloalkanols, C_{5-7} cycloalkanediols, C_{5-7} cycloalkanemethanols, saturated C_{5-7} heterocyclomethanols, tri-, tetra-, penta-, and hexavalent linear, branched, and cyclic alcohols with 3 to 10 carbon atoms, glycerin, 2,2-bis(hydroxymethyl)-1-octanol, erythritol, pentaerythritol, arabitol, xylitol, sorbitol, mannitol, isosorbitol, tetra(hydroxymethyl)cyclohexanol, and inositol;

R^{26} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

when b is 1, R^{27} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

when b is 2, R^{27} is alkylene in which a methylene group is optionally replaced by O, NH, or N-alkyl;

and the C=S analogs of C=O groups,

and the pharmaceutical acceptable salts thereof.

34. (previously presented): The method of claim 33 where:

R^{21} is selected from the group consisting of hydrogen, halogen, cyano, C_{1-6} alkyl, trifluoromethyl, C_{1-6} hydroxyalkyl, hydroxy, C_{1-6} alkoxy, C_{2-7} alkanoyloxy, C_{1-6} alkylthio, C_{1-6} aminoalkyl, amino, C_{1-6} alkylamino, di(C_{1-6} alkyl)amino, formyl, alkoxycarbonyl, aminocarbonyl, (C_{1-6} alkyl)aminocarbonyl, di(C_{1-6} alkyl)aminocarbonyl, and carboxy;

R^{22} is selected from the group consisting of hydrogen, halogen, C_{1-6} alkyl, trifluoromethyl, C_{1-6} hydroxyalkyl, hydroxy, alkoxy, C_{2-7} alkanoyloxy, C_{1-6} aminoalkyl, amino, (C_{1-6} alkoxy)carbonyl, aminocarbonyl, and carboxy;

R^{23} is selected from the group consisting of hydrogen, C_{1-6} alkyl, and C_{1-6} hydroxyalkyl;

R^{24} is selected from the group consisting of C_{1-6} alkyl, C_{3-6} alkenyl, C_{2-6} hydroxyalkyl, C_{2-6} alkoxyalkyl, and benzyl;

R^{26} is selected from the group consisting of hydrogen, C_{1-6} alkyl, C_{1-6} hydroxyalkyl, C_{3-6} alkoxyalkyl, C_{1-6} aminoalkyl, C_{4-12} dialkylaminoalkyl, and carboxymethyl;

when b is 1, R^{27} is selected from the group consisting of hydrogen, C_{1-6} alkyl, C_{1-6} hydroxyalkyl, C_{3-6} alkoxyalkyl, C_{1-6} aminoalkyl, C_{4-12} dialkylaminoalkyl, and carboxymethyl;

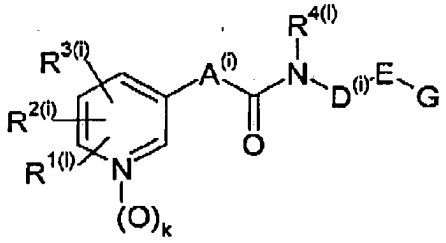
when b is 2, R^{27} is C_{2-10} alkylene in which a methylene group is optionally replaced by O, NH, or N-alkyl.

35. (previously presented): The method of claim 34 where the compound having vitamin PP activity or a prodrug thereof is selected from the group consisting of nicotinic acid, nicotinamide, and their pharmaceutically acceptable ester and amide derivatives, pharmaceutical acceptable salts, quaternary, and addition salts, N-oxides, and their C=S derivatives, their isomers, and prodrugs thereof.

36. (previously presented): The method of claim 35 where the compound having vitamin PP activity or a prodrug thereof is selected from the group consisting of nicotinic acid, nicotinamide, and mixtures thereof.

37. (Withdrawn): The method of claim 32 where the compound having vitamin PP activity or a prodrug thereof is tryptophan.

38. (previously presented): The method of claim 32 where the cancerostatic or immunosuppressive agent is selected from the group consisting of compounds of formula I:



(I)

where:

each of $R^{1(i)}$, $R^{2(i)}$, $R^{3(i)}$, and $R^{4(i)}$ are independently selected from the group consisting of hydrogen, halogen, hydroxy, trifluoromethyl, cyano, aliphatic hydrocarbyl residue optionally substituted with one or more functional groups and optionally interrupted by one or more heteroatoms, and aromatic hydrocarbyl residue; or $R^{1(i)}$ and $R^{2(i)}$ together form a bridge;

k is 0 or 1;

$A^{(i)}$ and $D^{(i)}$ are independently a saturated or unsaturated optionally substituted aliphatic hydrocarbyl residue, optionally interrupted by a heteroatom or a functional group;

E is a bond or is a heterocyclic residue having one or two ring nitrogen atoms or one ring nitrogen atom and one ring oxygen atom, linked to $D^{(i)}$ and G through a ring nitrogen atom and a ring carbon atom or through two ring nitrogen atoms; and

G is selected from the group consisting of hydrogen, an aliphatic or araliphatic residue, an unsaturated or aromatic monocyclic or polycyclic carbocyclic residue, a saturated, unsaturated, or aromatic monocyclic or polycyclic heterocyclic residue, bonded directly or through a functional group derived from a carbon, nitrogen, oxygen, sulfur, or phosphorus atom,

and the stereoisomers or racemic or non-racemic mixtures of stereoisomers thereof,

and the tautomers thereof when G is a heterocyclic aromatic ring or an aromatic ring substituted by a hydroxy, mercapto, or amino group,

and the pharmacologically acceptable acid addition salts thereof.

39. (previously presented): The method of claim 50 where the cancerostatic or immunosuppressive agent is selected from the group consisting of

N-[2-(1-benzylpiperidin-4-yl)ethyl]-3-(pyridin-3-yl)propionamide;

N-{2-[1-(2-phenylethyl)piperidin-4-yl]ethyl}-3-(pyridin-3-yl)-propionamide;

N-{2-[1-(4-phenylbutyl)piperidin-4-yl]ethyl}-3-(pyridin-3-yl)-propionamide;

N-{2-[1-(4-hydroxy-4-phenylbutyl)piperidin-4-yl]ethyl}-3-(pyridin-3-yl)propionamide;

N-[2-(1-diphenylmethylpiperidin-4-yl}ethyl]-3-(pyridin-3-yl)-propionamide,

N-[3-(1-diphenylmethylpiperidin-4-yl)propyl]-3-(pyridin-3-yl}propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-benzylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(2-phenylethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-{4-[1-(4-biphenylylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(1-naphthylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(9-anthrylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(cyclohexylphenylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-[2-(1-diphenylmethylpiperidin-4-yl)ethyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(1-diphenylmethylpiperidin-4-yl)propyl]-3-(pyridin-3-yl}acrylamide;

N-[5-(1-diphenylmethylpiperidin-4-yl)pentyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(1-diphenylmethylpiperidin-4-yl)hexyl]-3-(pyridin-3-yl}acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-(4-{1-[bis(4-fluorophenyl)methyl]piperidin-4-yl}butyl}-3-(pyridin-3-yl)acrylamide;

N-(4-{1-[bis(2-chlorophenyl)methyl]piperidin-4-yl}butyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(2-fluoro-pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(6-fluoro-pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide dihydrochloride;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide methanesulfonate;

N-[4-(1-acetylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-benzoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylacetylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-{4-[1-(9-oxo-9H-fluoren-4-carbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-[4-(1-methylsulfonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-{4-[1-(2-naphthylsulfonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-[4-(1-benzylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-(4-{1-[bis(2-chlorophenyl)methyl]piperidin-4-yl}butyl)-3-(pyridin-3-yl)propionamide;

N-{4-[1-(phenylpyridin-3-ylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-{4-[1-(9H-fluoren-9-yl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-{4-[1-(6,11-dihydrodibenzo[b,e]oxepin-11-yl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)propionamide;

N-{4-[1-(1-naphthylaminocarbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylaminocarbonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-{4-[1-(10,11-dihydrodibenzo[b,f]azepin-5-yl-carbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)-propionamide;

N-[4-(1-diphenylphosphinoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(2-fluoropyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(5-fluoropyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-2-fluoro-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-2,2-difluoro-3-(pyridin-3-yl)propionamide;

N-[5-(1-diphenylmethylpiperidin-4-yl)pentyl]-3-(pyridin-3-yl)propionamide;

N-[6-(1-diphenylmethylpiperidin-4-yl)hexyl]-3-(pyridin-3-yl)propionamide;

N-[2-(1-diphenylmethylpiperidin-4-yl)ethyl]-5-(pyridin-3-yl)pentanoic acid amide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)pentanoic acid amide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-N-hydroxy-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-2-hydroxy-3-(pyridin-3-yl)propionamide;

N-{4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-hydroxy-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-methylsulfonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(2-naphthylsulfonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(2-naphthylsulfonyl)piperidin-4-yl]butyl}-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[1-(1-naphthylaminocarbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylaminocarbonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylaminocarbonylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[1-(10,11-dihydrodibenzo[b,f]azepin-5-yl-carbonyl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)-acrylamide;

N-[4-(1-diphenylphosphinoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-acetylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylacetylpiperidin-4-yl)-butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(3,3-diphenylpropionyl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(1-benzoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-benzoylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[1-(9-oxo-9H-fluoren-4-ylcarbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(phenylpyridin-3-ylmethyl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(phenylpyridin-4-ylmethyl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(6,11-dihydrodibenzo[b,e]oxepin-11-yl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(6,11-dihydrodibenzo[b,e]thiepin-11-yl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)acrylamide;

N-[7-(1-diphenylmethylpiperidin-4-yl)heptyl]-3-(pyridin-3-yl)acrylamide;

N-[8-(1-diphenylmethylpiperidin-4-yl)octyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(1-diphenylmethylpiperidin-4-yloxy)propyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(1-benzylpiperidin-4-yloxy)propyl]-3-(pyridin-3-yl)acrylamide;

N-[2-(1-diphenylmethylpiperidin-4-yl)ethyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[5-(1-diphenylmethylpiperidin-4-yl)pentyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[6-(1-diphenylmethylpiperidin-4-yl)hexyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[4-(4-diphenylmethylpiperazin-1-yl)-3-hydroxybutyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(4-diphenylmethylpiperazin-1-yl)propoxy]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-diphenylmethylpiperazin-1-yl)-4-oxobutyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(4-diphenylmethylpiperazin-1-sulfonyl)propyl]-3-(pyridin-3-yl)acrylamide;

N-{2-[2-(4-diphenylmethylpiperazin-1-yl)ethoxy]ethyl}-3-(pyridin-3-yl)acrylamide;

N-(4-{4-[bis(4-fluorophenyl)methyl]piperazin-1-yl}but-2-enyl)-3-(pyridin-3-yl)acrylamide;

N-(4-{4-[(4-carboxyphenyl)phenylmethyl]piperazin-1-yl}butyl)-3-(pyridin-3-yl)acrylamide;

N-(4-{4-[(4-aminophenyl)phenylmethyl]piperazin-1-yl}butyl)-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(9H-fluoren-9-yl)piperazin-1-yl]butyl}-2-(pyridin-3-yloxy)acetamide;

N-{5-[4-(9H-fluoren-9-yl)piperazin-1-yl]pentyl}-3-(pyridin-3-yl)acrylamide;

N-{6-[4-(9H-fluoren-9-yl)piperazin-1-yl]hexyl}-3-(pyridin-3-yl)acrylamide;

3-(pyridin-3-yl)-N-{4-[4-(1,2,3,4-tetrahydronaphthalen-1-yl)piperazin-1-yl]butyl}acrylamide;

3-(pyridin-3-yl)-N-{4-[4-(5,6,7,8-tetrahydronaphthalen-1-yl)piperazin-1-yl]butyl}acrylamide;

N-{4-[4-{naphthalen-1-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[5-(4-biphenyl-2-ylpiperazin-1-yl)pentyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(4-biphenyl-2-ylpiperazin-1-yl)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-2-(pyridin-3-yloxy)acetamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)-propionamide;

N-{5-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]pentyl}-3-(pyridin-3-yl)-acrylamide;

N-{6-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]hexyl}-3-(pyridin-3-yl)-acrylamide;

N-{4-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]butyl}-5-(pyridin-3-yl)-2,4-pentadienic amide;

N-{4-[4-(6,11-dihydrodibenzo[b,e]oxepin-11-yl)piperazin-1-yl]butyl-3-(pyridin-3-yl)propionamide;

N-{2-[4-(6,11-dihydrodibenzo[b,e]thiepin-11-yl)piperazin-1-yl]ethyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-diphenylacetylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-benzoylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(2-aminobenzoyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(4-carboxybenzoyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(biphenyl-2-carbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(9-oxo-9H-fluoren-4-carbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(furan-2-carbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(naphthalen-1-ylaminocarbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-{4-[4-(diphenylaminocarbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(naphthalen-2-sulfonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-diphenylphosphinonylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(9H-fluoren-9-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-[4-(4-phenylpiperidin-1-yl)-butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(1H-indol-3-yl)piperidin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(2-oxo-2,3-dihydrobenzimidazol-1-yl)piperidin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-benzotriazol-1-ylpiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(hydroxydiphenylmethyl)piperidin-1-yl]butyl}-2-(pyridin-3-yloxy)acetamide;

N-[4-(4,4-diphenylpiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(6,11-dihydrodibenzo[b,e]thiepin-11-yliden)piperidin-1-yl]butyl}-3-(pyridin-3-yl)propionamide dihydrochloride semi-isopropanol;

N-{4-[4-(6,11-dihydrodibenzo[b,e]thiepin-11-yliden)piperidin-1-yl]butyl}-5-(pyridin-3-yl)pentanamide;

N-{4-[4-(4,9-dihydrothieno[2,3-b]benzo[e]thiepin-4-yliden)piperidin-1-yl]butyl}-3-(pyridin-3-yl)-propionamide;

N-{4-[4-(4,9-dihydrothieno[2,3-b]benzo[e]thiepin-4-yliden)piperidin-1-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-[4-(4-diphenylphosphinoyloxypiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,4-dioxa-8-azaspiro[4.5]dec-8-yl)buryl]-3-(pyridin-3-yl)acrylamide;

N-[4-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(2,6-dioxo-4-phenylpiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3-dioxo-4,5,6,7-tetraphenyl-1,3-dihydroisoindol-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(3-benzyl-2,4,5-trioxoimidazolidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3,10-trioxo-1,4,5,6,10,10a-hexahydroacenaphtho[1,8a-c]pyrrol-2-yl)butyl]-3-(pyridin-3-yl)-acrylamide;

N-[4-(2,5-dioxo-4,4-diphenylimidazolidin-1-yl)butyl-3-(pyridin-3-yl)acrylamide;

N-[4-(2,5-dioxo-3-phenyl-2,5-dihydropyrrol-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)propyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(3-pyridin-3-ylacryloylamino)butyl]-2,3:5,6-dibenzobicyclo[2.2.2]octan-7,8-dicarboximide;

N-[4-(5-benzyliden-2,4-dioxothiazolidin-3-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-benzyl-2,6-dioxopiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1,3-dioxo-1,3-dihydroisoindol-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)butyl]-3-(1-oxopyridin-3-yl)acrylamide;

N-[6-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[2-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)ethyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)buty1]-3-(pyridin-3-yl)acrylamide;

N-[8,8-bis(4-fluorophenyl)octyl]-3-(pyridin-3-yl)acrylamide hydrochloride;

N-[6-(3,3-diphenylureido)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-phenyl-1,2,4,5-tetrahydrobenzo[d]azepin-3-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-(8,8-diphenyloctyl)-3-(pyridin-3-yl)acrylamide;

N-(8-hydroxy-8,8-diphenyloctyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(3,3-diphenylureido)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1H,3H-benzo[de]isoquinolin-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(10,11-dihydrodibenzo[b,f]azepin-5-ylcarbonylamino)hexyl]-3-(pyridin-3-yl)acrylamide;

3-(pyridin-3-yl)-N-[6-tosylaminohexyl]acrylamide;

N-[4-(1,1-dioxo-1-thia-2-azaacenaphthylen-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-(6-hydroxy-6,6-diphenylhexyl)-3-(pyridin-3-yl)acrylamide;

N-(6,6-diphenylhex-5-enyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(4,5-diphenylimidazol-1-yl)butyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(trans-2-phenylcyclopropylcarbonylamino)butyl]-3-(pyridin-3-yl)acrylamide;

N-(5-hydroxy-5,5-diphenylpentyl)-3-(pyridin-3-yl)acrylamide;

N-(7-phenylheptyl)-3-(pyridin-3-yl)acrylamide;

N-(4-diphenylacetylaminobutyl)-3-(pyridin-3-yl)acrylamide;

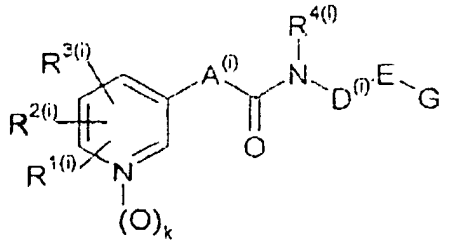
N-[4-(benzhydrylamino)butyl]-3-(pyridin-3-yl)acrylamide; and

N-(4-{[2-(benzhydrylmethylamino)ethyl]methylamino}butyl)-3-(pyridin-3-yl)acrylamide.

40. (previously presented): The method of claim 50 comprising the additional administration of a further cancerostatic or immunosuppressive agent that is not a compound of formula Ia.

41. (Withdrawn): A pharmaceutical composition comprising:

(a) at least one compound selected from the group consisting of compounds of formula I:



(I)

where:

each of $R^{1(i)}$, $R^{2(i)}$, $R^{3(i)}$, and $R^{4(i)}$ are independently selected from the group consisting of hydrogen, halogen, hydroxy, trifluoromethyl, cyano, aliphatic hydrocarbyl residue optionally substituted with one or more functional groups and optionally interrupted by one or more heteroatoms, and aromatic hydrocarbyl residue; or $R^{1(i)}$ and $R^{2(i)}$ together form a bridge;

k is 0 or 1;

$A^{(i)}$ and $D^{(i)}$ are independently a saturated or unsaturated optionally substituted aliphatic hydrocarbyl residue, optionally interrupted by a heteroatom or a functional group;

E is a bond or is a heterocyclic residue having one or two ring nitrogen atoms or one ring nitrogen atom and one ring oxygen atom, linked to $D^{(i)}$ and G through a ring nitrogen atom and a ring carbon atom or through two ring nitrogen atoms; and

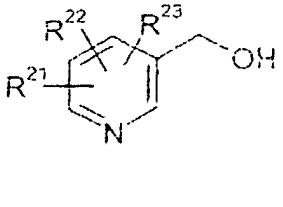
G is selected from the group consisting of hydrogen, an aliphatic or araliphatic residue, an unsaturated or aromatic monocyclic or polycyclic carbocyclic residue, a saturated, unsaturated, or aromatic monocyclic or polycyclic heterocyclic residue, bonded directly or through a functional group derived from a carbon, nitrogen, oxygen, sulfur, or phosphorus atom,

and the stereoisomers or racemic or non-racemic mixtures of stereoisomers thereof,

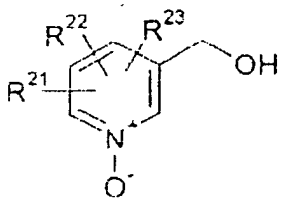
and the tautomers thereof when G is a heterocyclic aromatic ring or an aromatic ring substituted by a hydroxy, mercapto, or amino group,

and the pharmacologically acceptable acid addition salts thereof;

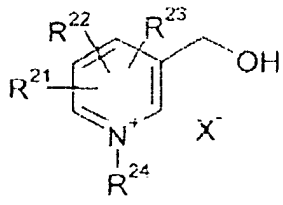
(b) at least one compound selected from the group consisting of compounds of formulae II, IIa, IIb, III, IIIa, IIIb, IIIc, IV, IVa, IVb, V, Va, and Vb:



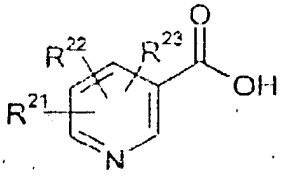
(II)



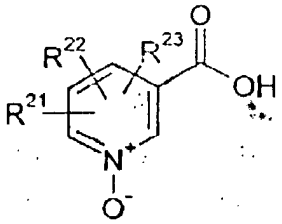
(IIa)



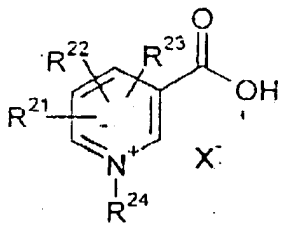
(IIb)



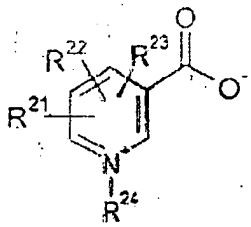
(III)



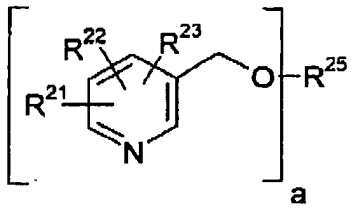
(IIIa)



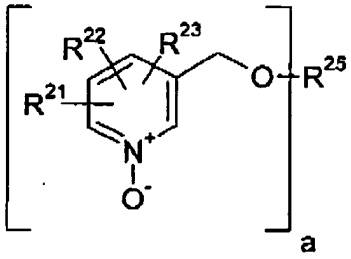
(IIIb)



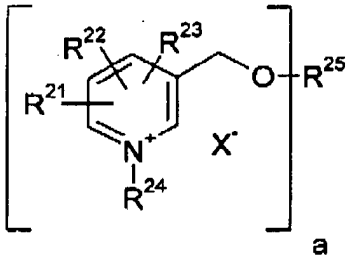
(IIIc)



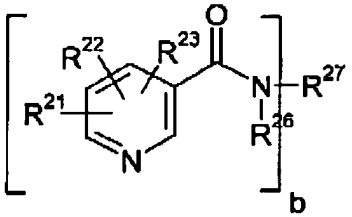
(IV)



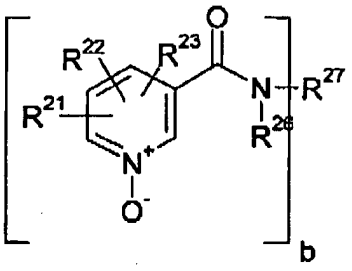
(IVa)



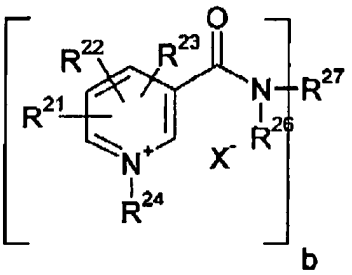
(IVb)



(V)



(Va)



(Vb)

where:

a is an integer of 1 through 6;

b is an integer of 1 through 2;

X^- is selected from the group consisting of fluoride, chloride, bromide, iodide, hydrogensulfate, mesylate, trifluoromethanesulfonate, tosylate, tetrafluoroborate, dihydrogenphosphate, and acetate;

R^{21} is selected from the group consisting of hydrogen, halogen, cyano, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, alkylthio, aminoalkyl, amino, alkylamino, dialkylamino, formyl, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, and carboxy;

R^{22} is selected from the group consisting of hydrogen, halogen, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, aminoalkyl, amino, alkoxycarbonyl, aminocarbonyl, and carboxy;

R^{23} is selected from the group consisting of hydrogen, alkyl, and hydroxyalkyl;

R^{24} is selected from the group consisting of alkyl, alkenyl, hydroxyalkyl, alkoxyalkyl, and aralkyl;

R^{25} is the residue of an alcohol $R^{25}(OH)_a$ ~~is~~ selected from monovalent linear and branched C_{1-10} alkanols and ω-dialkylaminoalkanols, benzyl alcohol, divalent linear and branched C_{2-10} diols, mono- or divalent C_{5-7} cycloalkanols, C_{5-7} cycloalkanediols, C_{5-7} cycloalkanemethanols, saturated C_{5-7} heterocyclomethanols, tri-, tetra-, penta-, and hexavalent linear, branched, and cyclic alcohols with 3 to 10 carbon atoms, glycerin, 2,2-bis(hydroxymethyl)-1-octanol, erythritol, pentaerythritol, arabitol, xylitol, sorbitol, mannitol, isosorbitol, tetra(hydroxymethyl)cyclohexanol, and inositol;

R^{26} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

when b is 1, R^{27} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

when b is 2, R^{27} is alkylene in which a methylene group is optionally replaced by O, NH, or N-alkyl;

and the C=S analogs of C=O groups,

and the pharmaceutical acceptable salts thereof; and

(c) at least one physiologically acceptable carrier.

42. (Withdrawn): The composition of claim 52 comprising a further cancerostatic or immunosuppressive agent that is not a compound of formula I.

43. (Withdrawn): The composition of claim 52 where the compound(s) of formula Ia and the compound(s) of formula II - Vb are contained separately within the composition.

44. (Withdrawn): The composition of claim 52 where the compound(s) of formula Ia and the compound(s) of formula II - Vb are present in separate dosage forms, and the dosage forms are packaged together for co-administration.

45. (Withdrawn) The composition of claim 52 where:

R^{21} is selected from the group consisting of hydrogen, halogen, cyano, C_{1-6} alkyl, trifluoromethyl, C_{1-6} hydroxyalkyl, hydroxy, C_{1-6} alkoxy, C_{2-7} alkanoyloxy, C_{1-6} alkylthio, C_{1-6} aminoalkyl, amino, C_{1-6} alkylamino, di(C_{1-6} alkyl)amino, formyl, alkoxycarbonyl, aminocarbonyl, (C_{1-6} alkyl)aminocarbonyl, di(C_{1-6} alkyl)aminocarbonyl, and carboxy;

R^{22} is selected from the group consisting of hydrogen, halogen, C_{1-6} alkyl, trifluoromethyl, C_{1-6} hydroxyalkyl, hydroxy, alkoxy, C_{2-7} alkanoyloxy, C_{1-6} aminoalkyl, amino, (C_{1-6} alkoxy)carbonyl, aminocarbonyl, and carboxy;

R^{23} is selected from the group consisting of hydrogen, C_{1-6} alkyl, and C_{1-6} hydroxyalkyl;

R^{24} is selected from the group consisting of C_{1-6} alkyl, C_{3-6} alkenyl, C_{2-6} hydroxyalkyl, C_{2-6} alkoxyalkyl, and benzyl;

R^{26} is selected from the group consisting of hydrogen, C_{1-6} alkyl, C_{1-6} hydroxyalkyl, C_{3-6} alkoxyalkyl, C_{1-6} aminoalkyl, C_{4-12} dialkylaminoalkyl, and carboxymethyl;

when b is 1, R^{27} is selected from the group consisting of hydrogen, C_{1-6} alkyl, C_{1-6} hydroxyalkyl, C_{3-6} alkoxyalkyl, C_{1-6} aminoalkyl, C_{4-12} dialkylaminoalkyl, and carboxymethyl; and

when b is 2, R^{27} is C_{2-10} alkylene in which a methylene group is optionally replaced by O, NH, or N-alkyl.

46. (Withdrawn): The composition of claim 52 where the compound having vitamin PP activity or a prodrug thereof is selected from the group consisting of nicotinic acid, nicotinamide, and their

pharmaceutically acceptable ester and amide derivatives, pharmaceutical acceptable salts, quaternary, and addition salts, N-oxides, and their C=S derivatives, their isomers, and prodrugs thereof.

47. (Withdrawn): The composition of claim 46 where the compound having vitamin PP activity or a prodrug thereof is selected from the group consisting of nicotinic acid, nicotinamide, and mixtures thereof.

48. (Withdrawn): The composition of claim 51 where the compound having vitamin PP activity or a prodrug thereof is tryptophan.

49. (Withdrawn): The composition of claim 52 where the compound(s) of formula Ia are selected from the group consisting of

N-[2-(1-benzylpiperidin-4-yl)ethyl]-3-(pyridin-3-yl)propionamide;

N-{2-[1-(2-phenylethyl)piperidin-4-yl]ethyl}-3-(pyridin-3-yl)propionamide;

N-{2-[1-(4-phenylbutyl)piperidin-4-yl]ethyl}-3-(pyridin-3-yl)propionamide;

N-{2-[1-(4-hydroxy-4-phenylbutyl)piperidin-4-yl]ethyl}-3-(pyridin-3-yl)propionamide;

N-[2-(1-diphenylmethylpiperidin-4-yl}ethyl]-3-(pyridin-3-yl)propionamide,

N-[3-(1-diphenylmethylpiperidin-4-yl)propyl]-3-(pyridin-3-yl}propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-benzylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(2-phenylethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(4-biphenylylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(1-naphthylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-{4-[1-(9-anthrylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(cyclohexylphenylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-[2-(1-diphenylmethylpiperidin-4-yl)ethyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(1-diphenylmethylpiperidin-4-yl)propyl]-3-(pyridin-3-yl}acrylamide;

N-[5-(1-diphenylmethylpiperidin-4-yl)pentyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(1-diphenylmethylpiperidin-4-yl)hexyl]-3-(pyridin-3-yl}acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-(4-{1-[bis(4-fluorophenyl)methyl]piperidin-4-yl}butyl)-3-(pyridin-3-yl)acrylamide;

N-(4-{1-[bis(2-chlorophenyl)methyl]piperidin-4-yl}butyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(2-fluoro-pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(6-fluoro-pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide dihydrochloride;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide methanesulfonate;

N-[4-(1-acetylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-benzoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylacetylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-{4-[1-(9-oxo-9H-fluoren-4-carbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-[4-(1-methylsulfonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-{4-[1-(2-naphthylsulfonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-[4-(1-benzylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-(4-{1-[bis(2-chlorophenyl)methyl]piperidin-4-yl}butyl)-3-(pyridin-3-yl)propionamide;

N-{4-[1-(phenylpyridin-3-ylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-{4-[1-(9H-fluoren-9-yl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)-propionamide;

N-{4-[1-(6,11-dihydrodibenzo[b,e]oxepin-11-yl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)propionamide;

N-{4-[1-(1-naphthylaminocarbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylaminocarbonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-{4-[1-(10,11-dihydrodibenzo[b,f]azepin-5-yl-carbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)-propionamide;

N-[4-(1-diphenylphosphinoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(2-fluoropyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(5-fluoropyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-2-fluoro-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-2,2-difluoro-3-(pyridin-3-yl)propionamide;

N-[5-(1-diphenylmethylpiperidin-4-yl)pentyl]-3-(pyridin-3-yl)propionamide;

N-[6-(1-diphenylmethylpiperidin-4-yl)hexyl]-3-(pyridin-3-yl)propionamide;

N-[2-(1-diphenylmethylpiperidin-4-yl)ethyl]-5-(pyridin-3-yl)pentanoic acid amide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)pentanoic acid amide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-N-hydroxy-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-2-hydroxy-3-(pyridin-3-yl)propionamide;

N-{4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-hydroxy-3-(pyridin-3-yl)propionamide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1-methylsulfonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(2-naphthylsulfonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(2-naphthylsulfonyl)piperidin-4-yl]butyl}-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[1-(1-naphthylaminocarbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylaminocarbonylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylaminocarbonylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[1-(10,11-dihydrodibenzo[b,f]azepin-5-yl-carbonyl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)-acrylamide;

N-[4-(1-diphenylphosphinoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-acetylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-diphenylacetylpiperidin-4-yl)-butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(3,3-diphenylpropionyl)piperidin-4-yl]-butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(1-benzoylpiperidin-4-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-benzoylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[1-(9-oxo-9H-fluoren-4-ylcarbonyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(phenylpyridin-3-ylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(phenylpyridin-4-ylmethyl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(6,11-dihydrodibenzo[b,e]oxepin-11-yl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[1-(6,11-dihydrodibenzo[b,e]thiepin-11-yl)piperidin-4-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[7-(1-diphenylmethylpiperidin-4-yl)heptyl]-3-(pyridin-3-yl)acrylamide;

N-[8-(1-diphenylmethylpiperidin-4-yl)octyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(1-diphenylmethylpiperidin-4-yloxy)propyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(1-benzylpiperidin-4-yloxy)propyl]-3-(pyridin-3-yl)acrylamide;

N-[2-(1-diphenylmethylpiperidin-4-yl)ethyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[4-(1-diphenylmethylpiperidin-4-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[5-(1-diphenylmethylpiperidin-4-yl)pentyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[6-(1-diphenylmethylpiperidin-4-yl)hexyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-[4-(4-diphenylmethylpiperazin-1-yl)-3-hydroxybutyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(4-diphenylmethylpiperazin-1-yl)propoxy]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-diphenylmethylpiperazin-1-yl)-4-oxobutyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(4-diphenylmethylpiperazin-1-sulfonyl)propyl]-3-(pyridin-3-yl)acrylamide;

N-{2-[2-(4-diphenylmethylpiperazin-1-yl)ethoxy]ethyl}-3-(pyridin-3-yl)acrylamide;

N-(4-{4-[bis(4-fluorophenyl)methyl]piperazin-1-yl}but-2-enyl)-3-(pyridin-3-yl)acrylamide;

N-(4-{4-[(4-carboxyphenyl)phenylmethyl]piperazin-1-yl}butyl)-3-(pyridin-3-yl)acrylamide;

N-(4-{4-[(4-aminophenyl)phenylmethyl]piperazin-1-yl}butyl)-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(9H-fluoren-9-yl)piperazin-1-yl]butyl}-2-(pyridin-3-yloxy)acetamide;

N-{5-[4-(9H-fluoren-9-yl)piperazin-1-yl]pentyl}-3-(pyridin-3-yl)acrylamide;

N-{6-[4-(9H-fluoren-9-yl)piperazin-1-yl]hexyl}-3-(pyridin-3-yl)acrylamide;

3-(pyridin-3-yl)-N-{4-[4-(1,2,3,4-tetrahydronaphthalen-1-yl)piperazin-1-yl]butyl}acrylamide;

3-(pyridin-3-yl)-N-{4-[4-(5,6,7,8-tetrahydronaphthalen-1-yl)piperazin-1-yl]butyl}acrylamide;

N-{4-[4-{naphthalen-1-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[5-(4-biphenyl-2-ylpiperazin-1-yl)pentyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(4-biphenyl-2-ylpiperazin-1-yl)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-2-(pyridin-3-yloxy)acetamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-5-(pyridin-3-yl)-2,4-pentadienic acid amide;

N-{4-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)-propionamide;

N-{5-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]pentyl}-3-(pyridin-3-yl)-acrylamide;

N-{6-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]hexyl}-3-(pyridin-3-yl)-acrylamide;

N-{4-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]butyl}-5-(pyridin-3-yl)-2,4-pentadienic amide;

N-{4-[4-(6,11-dihydrodibenzo[b,e]oxepin-11-yl)piperazin-1-yl]butyl-3-(pyridin-3-yl)propionamide;

N-{2-[4-(6,11-dihydrodibenzo[b,e]thiepin-11-yl)piperazin-1-yl]ethyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-diphenylacetylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-benzoylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(2-aminobenzoyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(4-carboxybenzoyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(biphenyl-2-carbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(9-oxo-9H-fluoren-4-carbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(furan-2-carbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(naphthalen-1-ylaminocarbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)propionamide;

N-{4-[4-(diphenylaminocarbonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(naphthalen-2-sulfonyl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-diphenylphosphinonylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-biphenyl-2-ylpiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(9H-fluoren-9-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(10,11-dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)piperazin-1-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-[4-(4-phenylpiperidin-1-yl)-butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(1H-indol-3-yl)piperidin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(2-oxo-2,3-dihydrobenzimidazol-1-yl)piperidin-1-yl]butyl}-3-(pyridin-3-yl)acrylamide;

N-[4-(4-benzotriazol-1-ylpiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(hydroxydiphenylmethyl)piperidin-1-yl]butyl}-2-(pyridin-3-yloxy)acetamide;

N-[4-(4,4-diphenylpiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-{4-[4-(6,11-dihydrodibenzo[b,e]thiepin-11-yliden)piperidin-1-yl]butyl}-3-(pyridin-3-yl)propionamide dihydrochloride semi-isopropanol;

N-{4-[4-(6,11-dihydrodibenzo[b,e]thiepin-11-yliden)piperidin-1-yl]butyl}-5-(pyridin-3-yl)pentanamide;

N-{4-[4-(4,9-dihydrothieno[2,3-b]benzo[e]thiepin-4-yliden)piperidin-1-yl]butyl}-3-(pyridin-3-yl)-propionamide;

N-{4-[4-(4,9-dihydrothieno[2,3-b]benzo[e]thiepin-4-yliden)piperidin-1-yl]butyl}-3-(pyridin-3-yl)-acrylamide;

N-[4-(4-diphenylphosphinoyloxypiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,4-dioxa-8-azaspiro[4.5]dec-8-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(2,6-dioxo-4-phenylpiperidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3-dioxo-4,5,6,7-tetraphenyl-1,3-dihydroisoindol-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(3-benzyl-2,4,5-trioxoimidazolidin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3,10-trioxo-1,4,5,6,10,10a-hexahydroacenaphtho[1,8a-c]pyrrol-2-yl)butyl]-3-(pyridin-3-yl)-acrylamide;

N-[4-(2,5-dioxo-4,4-diphenylimidazolidin-1-yl)butyl-3-(pyridin-3-yl)acrylamide;

N-[4-(2,5-dioxo-3-phenyl-2,5-dihydropyrrol-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[3-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)propyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(3-pyridin-3-ylacryloylamino)butyl]-2,3:5,6-dibenzobicyclo[2.2.2]octan-7,8-dicarboximide;

N-[4-(5-benzyliden-2,4-dioxothiazolidin-3-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(4-benzyl-2,6-dioxopiperazin-1-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(2,5-dioxo-3,4-diphenyl-2,5-dihydropyrrol-1-yl)butyl]-3-(pyridin-3-yl)propionamide;

N-[4-(1,3-dioxo-1,3-dihydroisoindol-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)butyl]-3-(1-oxopyridin-3-yl)acrylamide;

N-[6-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[2-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)ethyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1,3-dioxo-1H,3H-benzo[de]isoquinolin-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[8,8-bis(4-fluorophenyl)octyl]-3-(pyridin-3-yl)acrylamide hydrochloride;

N-[6-(3,3-diphenylureido)hexyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1-phenyl-1,2,4,5-tetrahydrobenzo[d]azepin-3-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-(8,8-diphenyloctyl)-3-(pyridin-3-yl)acrylamide;

N-(8-hydroxy-8,8-diphenyloctyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(3,3-diphenylureido)butyl]-3-(pyridin-3-yl)acrylamide;

N-[4-(1H,3H-benzo[de]isoquinolin-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-[6-(10,11-dihydrodibenzo[b,f]azepin-5-ylcarbonylamino)hexyl]-3-(pyridin-3-yl)acrylamide;

3-(pyridin-3-yl)-N-[6-tosylaminohexyl]acrylamide;

N-[4-(1,1-dioxo-1-thia-2-azaacenaphthylen-2-yl)butyl]-3-(pyridin-3-yl)acrylamide;

N-(6-hydroxy-6,6-diphenylhexyl)-3-(pyridin-3-yl)acrylamide;

N-(6,6-diphenylhex-5-enyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(4,5-diphenylimidazol-1-yl)butyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(trans-2-phenylcyclopropylcarbonylamino)butyl]-3-(pyridin-3-yl)acrylamide;

N-(5-hydroxy-5,5-diphenylpentyl)-3-(pyridin-3-yl)acrylamide;

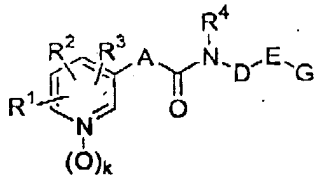
N-(7-phenylheptyl)-3-(pyridin-3-yl)acrylamide;

N-(4-diphenylacetylaminobutyl)-3-(pyridin-3-yl)acrylamide;

N-[4-(benzhydrylamino)butyl]-3-(pyridin-3-yl)acrylamide; and

N-(4-{[2-(benzhydrylmethylamino)ethyl]methylamino}butyl)-3-(pyridin-3-yl)acrylamide.

50. (Previously presented): The method of claim 38 where the cancerostatic or immunosuppressive agent is selected from the group consisting of compounds of formula Ia:



(Ia)

where:

R^1 is selected from the group consisting of hydrogen, fluorine, methyl, trifluoromethyl, and hydroxy;

R^2 and R^3 are each hydrogen;

R^4 is hydrogen or hydroxy;

A is selected from the group consisting of ethylene, propylene, or butylene, each optionally substituted with hydroxy or one or two fluorine atoms, $-OCH_2-$, $-SCH_2-$, ethenylene, vinylene, and butadienylene;

D is selected from the group consisting of C_2 - C_6 alkylene and C_2 - C_6 alkenylene, where the double bond may also join D and E;

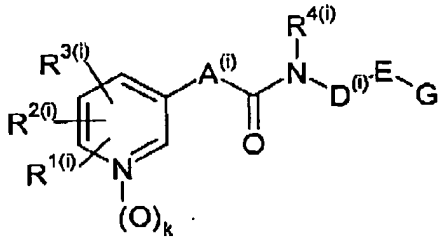
E is selected from the group consisting of pyrrolidine, piperidine, hexahydroazepine, and morpholine; and

G is selected from the group consisting of benzyl, phenethyl, fluorenylmethyl, anthrylmethyl, diphenylmethyl, fluorenyl, dihydrodibenzocycloheptenyl, furylmethyl, thienylmethyl, thiazolylmethyl, pyridylmethyl, benzothienylmethyl, quinolylmethyl, phenylthienylmethyl, phenylpyridylmethyl, dihydrodibenzoxepinyl, dihydrodibenzothiepinyl, acetyl, pivaloyl, phenylacetyl, diphenylacetyl, diphenylpropionyl, naphthylacetyl, benzoyl, naphthoyl,

anthrylcarbonyl, oxofluorenylcarbonyl, oxodihydroanthrylcarbonyl, dioxodihydroanthrylcarbonyl, furoyl, pyridylcarbonyl, chromonylcarbonyl, quinolylcarbonyl, naphthylaminocarbonyl, dibenzylaminocarbonyl, benzylphenylaminocarbonyl, diphenylaminocarbonyl, indolin-1-ylcarbonyl, dihydrodibenzazepinyl-N-carbonyl, tetrahdroquinolinyl-N-carbonyl, tetrahydrobenzazepinyl-N-carbonyl, methanesulfonyl, benzenesulfonyl, p-toluenesulfonyl, naphthalenesulfonyl, quinolinesulfonyl, and diphenylphosphinoyl, where each aromatic ring system may be independently substituted with one to three substituents selected independently from the group consisting of halogen, cyano, C_1 - C_6 alkyl, trifluoromethyl, C_3 - C_8 cycloalkyl, phenyl, benzyl, hydroxy, C_1-C_6 alkoxy (optionally partially or completely fluorinated), benzyloxy, phenoxy, mercapto, C_1 - C_6 alkylthio, carboxy, C_1 - C_6 alkoxycarbonyl, benzyloxycarbonyl, nitro, amino, C_1 - C_6 alkylamino, and di(C_1 - C_6 alkyl)amino, or two adjacent substituents together form methylenedioxy.

51. (Withdrawn): A pharmaceutical composition comprising:

(a) at least one compound selected from the group consisting of compounds of formula I:



(I)

where:

each of $R^{1(i)}$, $R^{2(i)}$, $R^{3(i)}$, and $R^{4(i)}$ are independently selected from the group consisting of hydrogen, halogen, hydroxy, trifluoromethyl, cyano, aliphatic hydrocarbyl residue optionally substituted with one or more functional groups and optionally interrupted by one or more heteroatoms, and aromatic hydrocarbyl residue; or $R^{1(i)}$ and $R^{2(i)}$ together form a bridge;

k is 0 or 1;

$A^{(i)}$ and $D^{(i)}$ are independently a saturated or unsaturated optionally substituted aliphatic hydrocarbyl residue, optionally interrupted by a heteroatom or a functional group;

E is a bond or is a heterocyclic residue having one or two ring nitrogen atoms or one ring nitrogen atom and one ring oxygen atom, linked to $D^{(i)}$ and G through a ring nitrogen atom and a ring carbon atom or through two ring nitrogen atoms; and

G is selected from the group consisting of hydrogen, an aliphatic or araliphatic residue, an unsaturated or aromatic monocyclic or polycyclic carbocyclic residue, a saturated, unsaturated, or aromatic monocyclic or polycyclic heterocyclic residue, bonded directly or through a functional group derived from a carbon, nitrogen, oxygen, sulfur, or phosphorus atom,

and the stereoisomers or racemic or non-racemic mixtures of stereoisomers thereof,

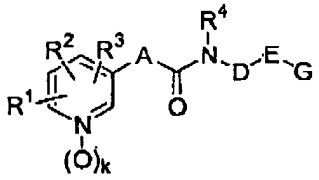
and the tautomers thereof when G is a heterocyclic aromatic ring or an aromatic ring substituted by a hydroxy, mercapto, or amino group,

and the pharmacologically acceptable acid addition salts thereof;

(b) a compound having vitamin PP activity or a prodrug thereof; and

(c) at least one physiologically acceptable carrier.

52. (Withdrawn): The composition of claim 41 where the compound(s) of formula I are selected from the group consisting of compounds of formula Ia:



(Ia)

where:

R^1 is selected from the group consisting of hydrogen, fluorine, methyl, trifluoromethyl, and hydroxy;

R^2 and R^3 are each hydrogen;

R^4 is hydrogen or hydroxy;

A is selected from the group consisting of ethylene, propylene, or butylene, each optionally substituted with hydroxy or one or two fluorine atoms, $-OCH_2-$, $-SCH_2-$, ethenylene, vinylene, and butadienylene;

D is selected from the group consisting of C_2 - C_6 alkylene and C_2 - C_6 alkenylene, where the double bond may also join D and E;

E is selected from the group consisting of pyrrolidine, piperidine, hexahydroazepine, and morpholine; and

G is selected from the group consisting of benzyl, phenethyl, fluorenylmethyl, anthrylmethyl, diphenylmethyl, fluorenyl, dihydrodibenzocycloheptenyl, furylmethyl, thienylmethyl,

thiazolylmethyl, pyridylmethyl, benzothienylmethyl, quinolylmethyl, phenylthienylmethyl, phenylpyridylmethyl, dihydrodibenzoxepinyl, dihydrodibenzothiepinyl, acetyl, pivaloyl, phenylacetyl, diphenylacetyl, diphenylpropionyl, naphthylacetyl, benzoyl, naphthoyl, anthrylcarbonyl, oxofluorenylcarbonyl, oxodihydroanthrylcarbonyl, dioxodihydroanthrylcarbonyl, furoyl, pyridylcarbonyl, chromonylcarbonyl, quinolylcarbonyl, naphthylaminocarbonyl, dibenzylaminocarbonyl, benzylphenylaminocarbonyl, diphenylaminocarbonyl, indolin-1-ylcarbonyl, dihydrodibenzazepinyl-N-carbonyl, tetrahdroquinolinyl-N-carbonyl, tetrahydrobenzazepinyl-N-carbonyl, methanesulfonyl, benzenesulfonyl, p-toluenesulfonyl, naphthalenesulfonyl, quinolinesulfonyl, and diphenylphosphinoyl, where each aromatic ring system may be independently substituted with one to three substituents selected independently from the group consisting of halogen, cyano, C_1 - C_6 alkyl, trifluoromethyl, C_3 - C_8 cycloalkyl, phenyl, benzyl, hydroxy, C_1 - C_6 alkoxy (optionally partially or completely fluorinated), benzyloxy, phenoxy, mercapto, C_1 - C_6 alkylthio, carboxy, C_1 - C_6 alkoxycarbonyl, benzyloxycarbonyl, nitro, amino, C_1 - C_6 alkylamino, and di(C_1 - C_6 alkyl)amino, or two adjacent substituents together form methylenedioxy.

53. (Previously presented): The method of claim 50 where the cancerostatic or immunosuppressive agent is selected from the group consisting of compounds of formula Ia where:

R^1 is selected from the group consisting of hydrogen, fluorine, methyl, trifluoromethyl, and hydroxy;

R^2 and R^3 are each hydrogen;

R^4 is hydrogen or hydroxy;

A is selected from the group consisting of ethylene, propylene, or butylene, each optionally substituted with hydroxy or one or two fluorine atoms, $-OCH_2-$, $-SCH_2-$, ethenylene, vinylene, and butadienylene;

D is selected from the group consisting of C_2 - C_6 alkylene and C_2 - C_6 alkenylene, where the double bond may also join D and E;

E is selected from the group consisting of pyrrolidine, piperidine, and hexahydroazepine; and

G is selected from the group consisting of benzyl, phenethyl, fluorenylmethyl, anthrylmethyl, diphenylmethyl, fluorenyl, dihydrodibenzocycloheptenyl, acetyl, pivaloyl, phenylacetyl, diphenylacetyl, diphenylpropionyl, naphthylacetyl, benzoyl, naphthoyl, anthrylcarbonyl, naphthylaminocarbonyl, dibenzylaminocarbonyl, benzylphenylaminocarbonyl, diphenylaminocarbonyl, methanesulfonyl, benzenesulfonyl, p-toluenesulfonyl, and naphthalenesulfonyl, where each aromatic ring system may be independently substituted with one to three substituents selected independently from the group consisting of halogen, cyano, C_1 - C_6 alkyl, trifluoromethyl, C_3 - C_8 cycloalkyl, phenyl, benzyl, hydroxy, C_1 - C_6 alkoxy (optionally partially or completely fluorinated), benzyloxy, phenoxy, mercapto, C_1 - C_6 alkylthio, carboxy, C_1 - C_6 alkoxycarbonyl, benzyloxycarbonyl, nitro, amino, C_1 - C_6 alkylamino, and di(C_1 - C_6 alkyl)amino, or two adjacent substituents together form methylenedioxy.

54. (Previously presented): The method of claim 53 where the cancerostatic or immunosuppressive agent is selected from the group consisting of compounds of formula Ia where:

R^1 is selected from the group consisting of hydrogen, fluorine, methyl, trifluoromethyl, and hydroxy;

R^2 and R^3 are each hydrogen;

R^4 is hydrogen or hydroxy;

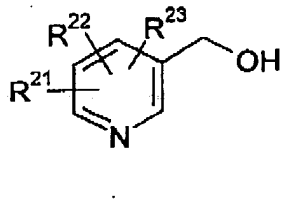
A is selected from the group consisting of ethylene, propylene, or butylene, each optionally substituted with hydroxy or one or two fluorine atoms, $-OCH_2-$, $-SCH_2-$, ethenylene, vinylene, and butadienylene;

D is selected from the group consisting of C_2 - C_6 alkylene and C_2 - C_6 alkenylene, where the double bond may also join D and E;

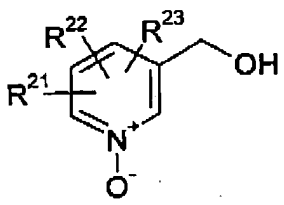
E is selected from the group consisting of pyrrolidine, piperidine, and hexahydroazepine; and

G is selected from the group consisting of benzyl, phenethyl, fluorenylmethyl, anthrylmethyl, diphenylmethyl, fluorenyl, and dihydrodibenzocycloheptenyl, where each aromatic ring system may be independently substituted with one to three substituents selected independently from the group consisting of halogen, cyano, C_1 - C_6 alkyl, trifluoromethyl, C_3 - C_8 cycloalkyl, phenyl, benzyl, hydroxy, C_1 - C_6 alkoxy (optionally partially or completely fluorinated), benzyloxy, phenoxy, mercapto, C_1 - C_6 alkylthio, carboxy, C_1 - C_6 alkoxycarbonyl, benzyloxycarbonyl, nitro, amino, C_1 - C_6 alkylamino, and di(C_1 - C_6 alkyl)amino, or two adjacent substituents together form methylenedioxy.

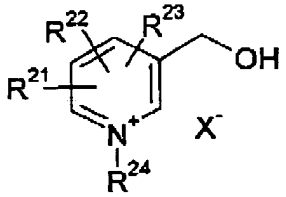
55. (Previously presented) The method of claim 32 where the compound having vitamin PP activity or a prodrug thereof is selected from the group consisting of compounds of formulae II, IIa, IIb, III, IIIa, IIIb, IIIc, IV, IVa, IVb, V, Va, and Vb:



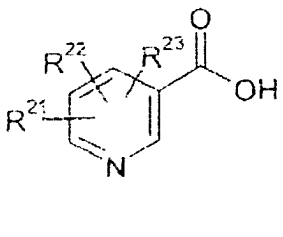
(II)



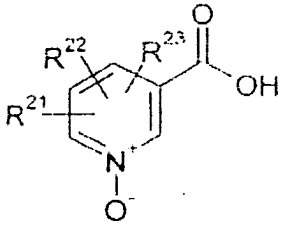
(IIa)



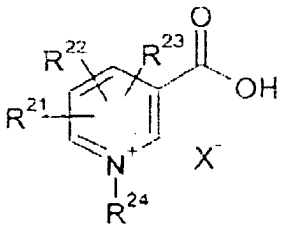
(IIb)



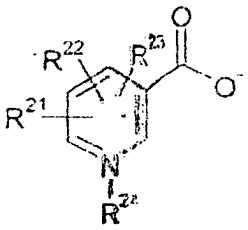
(III)



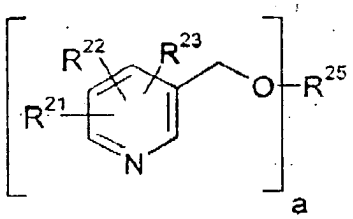
(IIIa)



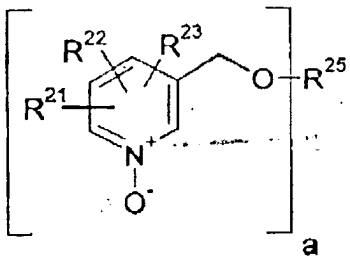
(IIIb)



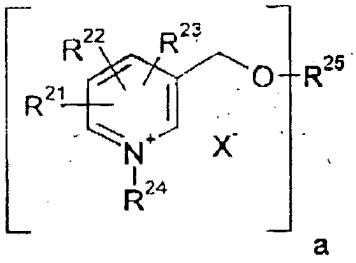
(IIIc)



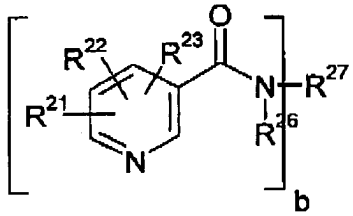
(IV)



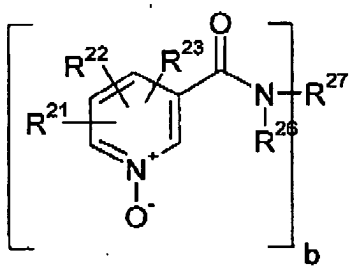
(IVa)



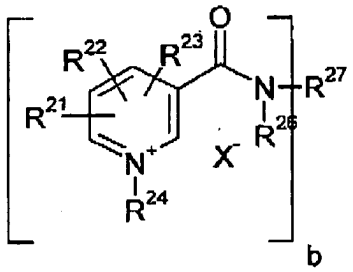
(IVb)



(V)



(Va)



(Vb)

where:

a is an integer of 1 through 6;

b is an integer of 1 through 2;

X^- is selected from the group consisting of fluoride, chloride, bromide, iodide, hydrogensulfate, mesylate, trifluoromethanesulfonate, tosylate, tetrafluoroborate, dihydrogenphosphate, and acetate;

R^{21} is selected from the group consisting of hydrogen, halogen, cyano, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, alkylthio, aminoalkyl, amino, alkylamino,

dialkylamino, formyl, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, and carboxy;

R^{22} is selected from the group consisting of hydrogen, halogen, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, aminoalkyl, amino, alkoxycarbonyl, aminocarbonyl, and carboxy;

R^{23} is selected from the group consisting of hydrogen, alkyl, and hydroxyalkyl;

R^{24} is selected from the group consisting of alkyl, alkenyl, hydroxyalkyl, alkoxyalkyl, and aralkyl;

R^{25} is the residue of an alcohol $R^{25}(OH)_a$ selected from monovalent linear and branched C_{1-10} alkanols and ω-dialkylaminoalkanols, benzyl alcohol, divalent linear and branched C_{2-10} diols, mono- or divalent C_{5-7} cycloalkanols, C_{5-7} cycloalkanediols, C_{5-7} cycloalkanemethanols, saturated C_{5-7} heterocyclomethanols, tri-, tetra-, penta-, and hexavalent linear, branched, and cyclic alcohols with 3 to 10 carbon atoms, glycerin, 2,2-bis(hydroxymethyl)-1-octanol, erythritol, pentaerythritol, arabitol, xylitol, sorbitol, mannitol, isosorbitol, tetra(hydroxymethyl)cyclohexanol, and inositol;

R^{26} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

when b is 1, R^{27} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

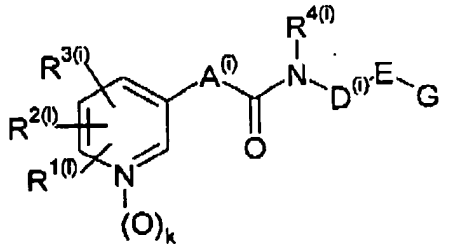
when b is 2, R^{27} is alkylene in which a methylene group is optionally replaced by O, NH, or N-alkyl;

and the C=S analogs of C=O groups,

and the acid addition salts or the sodium, potassium, magnesium, calcium or aluminum salts thereof.

56. (Previously presented) A pharmaceutical composition comprising:

(a) at least one compound selected from the group consisting of compounds of formula I:



(I)

where:

each of $R^{1(i)}$, $R^{2(i)}$, $R^{3(i)}$, and $R^{4(i)}$ are independently selected from the group consisting of hydrogen, halogen, hydroxy, trifluoromethyl, cyano, aliphatic hydrocarbyl residue optionally substituted with one or more functional groups and optionally interrupted by one or more heteroatoms, and aromatic hydrocarbyl residue; or $R^{1(i)}$ and $R^{2(i)}$ together form a bridge;

k is 0 or 1;

$A^{(i)}$ and $D^{(i)}$ are independently a saturated or unsaturated optionally substituted aliphatic hydrocarbyl residue, optionally interrupted by a heteroatom or a functional group;

E is a bond or is a heterocyclic residue having one or two ring nitrogen atoms or one ring nitrogen atom and one ring oxygen atom, linked to $D^{(i)}$ and G through a ring nitrogen atom and a ring carbon atom or through two ring nitrogen atoms; and

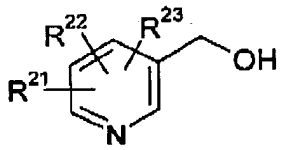
G is selected from the group consisting of hydrogen, an aliphatic or araliphatic residue, an unsaturated or aromatic monocyclic or polycyclic carbocyclic residue, a saturated, unsaturated, or aromatic monocyclic or polycyclic heterocyclic residue, bonded directly or through a functional group derived from a carbon, nitrogen, oxygen, sulfur, or phosphorus atom,

and the stereoisomers or racemic or non-racemic mixtures of stereoisomers thereof,

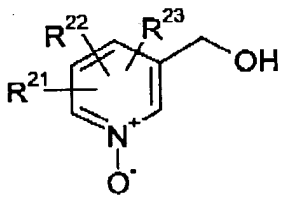
and the tautomers thereof when G is a heterocyclic aromatic ring or an aromatic ring substituted by a hydroxy, mercapto, or amino group,

and the pharmacologically acceptable acid addition salts thereof;

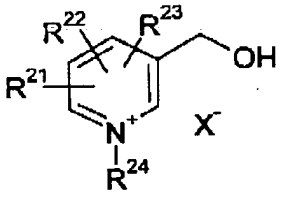
(b) at least one compound selected from the group consisting of compounds of formulae II, IIa, IIb, III, IIIa, IIIb, IIIc, IV, IVa, IVb, V, Va, and Vb:



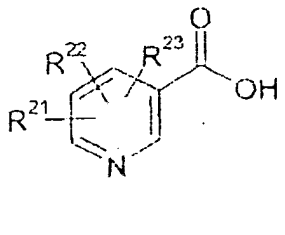
(II)



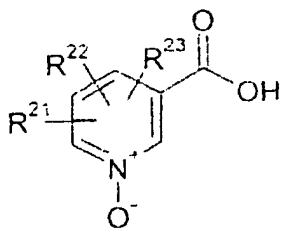
(IIa)



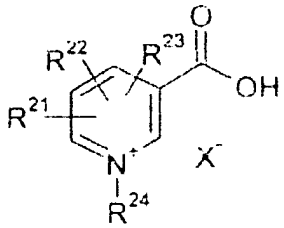
(IIb)



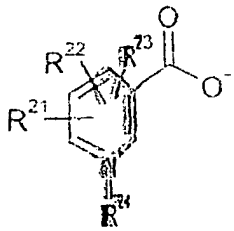
(III)



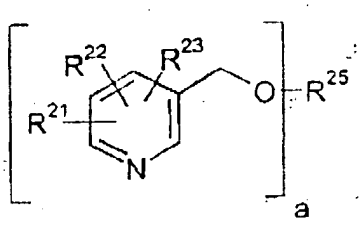
(IIIa)



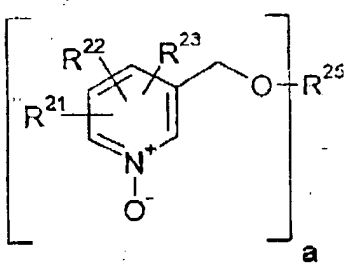
(IIIb)



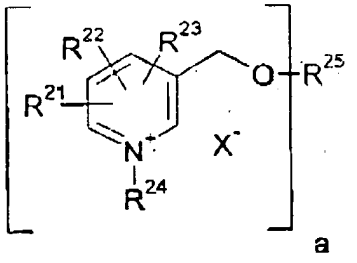
(IIIc)



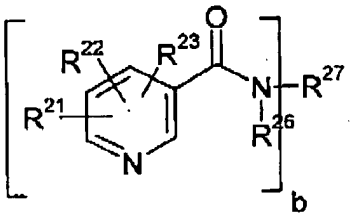
(IV)



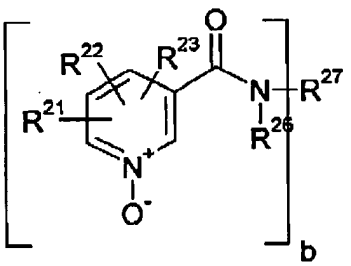
(IVa)



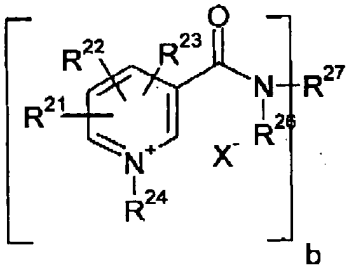
(IVb)



(V)



(Va)



(Vb)

where:

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R^{21} is selected from the group consisting of hydrogen, halogen, cyano, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, alkylthio, aminoalkyl, amino, alkylamino,

dialkylamino, formyl, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, and carboxy;

R^{22} is selected from the group consisting of hydrogen, halogen, alkyl, trifluoromethyl, hydroxyalkyl, hydroxy, alkoxy, alkanoyloxy, aminoalkyl, amino, alkoxycarbonyl, aminocarbonyl, and carboxy;

R^{23} is selected from the group consisting of hydrogen, alkyl, and hydroxyalkyl;

R^{24} is selected from the group consisting of alkyl, alkenyl, hydroxyalkyl, alkoxyalkyl, and aralkyl;

R^{25} is the residue of an alcohol $R^{25}(OH)_a$ selected from monovalent linear and branched C_{1-10} alkanols and ω-dialkylaminoalkanols, benzyl alcohol, divalent linear and branched C_{2-10} diols, mono- or divalent C_{5-7} cycloalkanols, C_{5-7} cycloalkanediols, C_{5-7} cycloalkanemethanols, saturated C_{5-7} heterocyclomethanols, tri-, tetra-, penta-, and hexavalent linear, branched, and cyclic alcohols with 3 to 10 carbon atoms, glycerin, 2,2-bis(hydroxymethyl)-1-octanol, erythritol, pentaerythritol, arabitol, xylitol, sorbitol, mannitol, isosorbitol, tetra(hydroxymethyl)cyclohexanol, and inositol;

R^{26} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

when b is 1, R^{27} is selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, dialkylaminoalkyl, and carboxymethyl;

when b is 2, R^{27} is alkylene in which a methylene group is optionally replaced by O, NH, or N-alkyl;

and the C=S analogs of C=O groups,

and the acid addition salts or the sodium, potassium, magnesium, calcium or aluminum salts thereof; and

(c) at least one physiologically acceptable carrier.